synchronous over multiple symbols, and has a normalized envelope over all symbols; and

applying input signals from both I and Q channels to said mapping to form a coded waveform representing said signals.

- 8. (New) A method as in claim 7, wherein said mapping comprises forming a mapping of a FPQSK signal.
- 9. (New) A method as in claim 7, wherein said mapping comprises investigating in phase bits, investigating quadrature bits, and classing said bits as either: 1) applying only to the in phase signal, 2) applying only to the quadrature signal, or 3) applying both to the in phase and to the quadrature signal.
- 10. (New) A method as in claim 8, wherein said mapping forms an output which does not include any slope discontinuities at transitions between different waveforms.
- 11. (New) A method as in claim 9, further comprising defining a binary coded decimal representation of said bits.

12. (New) A method, comprising:

forming full symbol mappings between in phase (I) and quadrature (Q) bitstreams;

producing an output coded waveform representative of the in phase and quadrature bitstreams;

delaying one of said bitstreams by half a symbol so that both I and Q parts of the bitstreams are simultaneously available; and

using both said I and Q parts to obtain one of said mappings.

13. (New) A method, comprising:

obtaining a data stream of bits;

separating said stream into in phase and quadrature sequences;

delaying one of said sequences to form time synchronous I and Q sequences; and

coding a full symbol of the I and Q sequences into coded waveforms indicative thereof.

(New) A method as in claim 13 wherein said coding comprises mapping signal sets onto functions using a waveform having a specified waveshape.

- 15. (New) A method as in claim 14, wherein said mapping comprises cross correlating among the I and Q signals.
- 16. (New) A method as in claim 15 wherein said cross correlating comprises, for each signal I, determining a subset which will be used to determine only an I part of the function, and determining a second subset which will be used to determine only a Q part of the function, and determining a third subset which will be used to determine both I and Q parts of the function.
- BI Cett.
- 17. (New) A method as in claim 16 wherein said cross correlating comprises, for each signal Q, determining a subset which will be used to determine only an I part of the function, and determining a second subset which will be used to determine only a Q part of the function, and determining a third subset which will be used to determine both I and Q parts of the function.
- 18. (New) A method as in claim 16, further comprising determining the I part of the function from the first subset of both the I and Q signals.

- 19. (New) A method as in claim 17, wherein said signals are obtained to a code according to a FQPSK coding scheme.
- 20. A method as in claim 17 further comprising defining symbols according to numbers, and obtaining binary coded decimal indices for said numbers.
- 21. (New) A method as in claim 13, further comprising mapping said signals to waveforms, wherein said waveforms are selected such that a waveform for an entire symbol has zero slope at its end points, such that there is zero slope discontinuity between symbol transitions in waveforms.
- 22. (New) A method as in claim 21, wherein said waveforms also have no slope discontinuities within each waveform.
  - 23. (New) A coding system, comprising:

a serial to parallel converter, receiving a plurality of bits at an input thereof, and providing said bits to both an in phase and a quadrature channel;

using both of said in phase and quadrature channels to code said bits as a waveform, by cross correlating and mapping said

signals to a specified waveform based on a waveform table which maps between full symbols and coded outputs of said in phase and quadrature channels;

delaying one of said in phase and quadrature channels relative to the other to ensure time synchronicity; and

transmitting the waveforms to represent said plurality of bits.

- 24. (New) A system as in claim 23 wherein said cross correlating comprises separating said signals into I only portions from both the I and Q channels, Q only portions from both the I and Q channels, and I and Q portions from both the I and Q channels.
- 25. (New) A system as in claim 24, wherein said mapping comprises determining a plurality of waveforms for a specified coding scheme based on full symbol mappings; and encoding each of said signals according to said mapping.
- 26. (New) A system as in claim 25 wherein said symbols are FQPSK symbols.

6



- 32. A method as in claim 31 wherein said bits are used to form mappings in pairs of I and Q bits to form FOPSK signals.
- (New) A method as in claim 31 wherein said coding is 33. for FQPSK.
- 34. A method as in claim 33, further comprising determining a slope discontinuity in points between different parts of the multiple possible transmitted waveforms, and modifying the waveforms according to

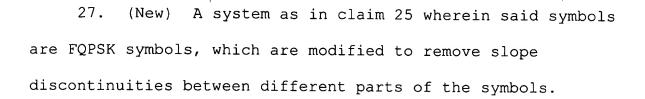


$$s_{5}(t) = \begin{cases} \sin \frac{\pi t}{T_{s}} + (1 - A)\sin^{2} \frac{\pi t}{T_{s}}, & -T_{s}/2 \le t \le 0\\ \sin \frac{\pi t}{T_{s}}, & 0 \le t \le T_{s}/2 \end{cases}$$

$$s_{13}(t) = -s_{5}(t)$$

$$s_{6}(t) = \begin{cases} \sin \frac{\pi t}{T_{s}}, & -T_{s}/2 \le t \le 0\\ \sin \frac{\pi t}{T_{s}} - (1 - A)\sin^{2} \frac{\pi t}{T_{s}}, & 0 \le t \le T_{s}/2 \end{cases}$$
 (5)

(New) A method as in claim 28, wherein said mapping comprises a modified method of FQPSK mapping which does not have a slope discontinuity at its midpoint. --



## 28. (New) A method, comprising:

forming a table which correlates between full symbol encoder outputs and specified outputs of a specified coding system using symbol by symbol mappings; and

using input data sequences to form outputs in the specified coding system.

- 29. (New) The method as in claim 28 wherein the specified coding system is an FQPSK system.
- 30. (New) A method as in claim 28, wherein said using comprises mapping specified bits to specified signals without storing said signals in a memory.
- 31. (New) A method as in claim 28 wherein said using comprises determining, from each of the I and Q channels, bits which represent only I information, bits which represent only Q information, and bits which represent both I and Q information, and using said bits to form the outputs.

7